PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: ALLEN et al.

Application: STORAGE AREA NETWORK MANAGEMENT AND CONFIGURATION METHOD AND APPARATUS VIA ENABLING IN-BAND COMMUNICATIONS

Serial No.: 09/657,234

Filing Date: September 7, 2000

Art Unit: 2143

Examiner: David E. England

Case: ROC92000-0220-US1

APPEAL BRIEF FOR APPLICANTS

JOAN PENNINGTON
535 North Michigan Avenue
Unit 1804
Chicago, Illinois 60611

One of the Attorneys for Applicants

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535 North Michigan Avenue
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P.O Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF FOR APPLICANTS

Sir:

This is an appeal of the final rejection of claims 1-4, 6, and 8-18 under 35 U.S.C. §103(a) mailed September 11, 2007. For the reasons set forth below, it is submitted that the Board should reverse the final rejection of claims 1-4, 6, and 8-18.

(1) REAL PARTY IN INTEREST

The real party of interest is International Business Machines Corporation.

(2) RELATED APPEALS AND INTERFERENCES

Applicants' attorney knows of no other appeals or interferences that would have a bearing on the Board's decision in the present appeal.

(3) STATUS OF CLAIMS

Claims 1-4, 6, and 8-18 have been finally rejected as unpatentable under 35 U.S.C. § 103(a) in an office action mailed September 11, 2007. The rejections of each of the pending claims 1-4, 6, and 8-18 have been appealed.

(4) STATUS OF AMENDMENTS

No amendment was filed after the final rejection of claims.

(5) SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention as recited by independent claims 1, and 11 and representative dependant claims 3, 8, 9, and 13 can best be appreciated and understood with reference to the patent specification (hereinafter page p., line l.) and drawings of the invention.

Problems exist in known storage area network arrangements. For example, some known storage area network arrangements, such as in a serial storage architecture (SSA), device driver writers and host based adapter (HBA) vendors provide a complex set of micro code calls. A management program would then interrogate the HBA, using micro code calls specific to the particular HBA vendor and model, then interpret the results in a way that is specific to that particular HBA vendor and model.

One problem with this arrangement is that an in-depth understanding is needed for every HBA model of every vendor, which in the case of Fibre Channel, is impractical. There are too many vendors and too many models to implement this approach. Another problem is that certain HBA models from certain vendors simply cannot support the necessary micro code calls to enable the devices to be managed, and thus prohibiting a SAN management program from working with these devices. (p. 1, l. 5-23, p. 2 l. 1-4)

The present invention effectively implements a mechanism for communicating with devices in-band or over a fibre cable, allowing maximized flexibility, in a vendor and device independent manner. (p. 2, l. 6-12) In accordance with features of the invention, management application agent provides predefined, fibre channel standard, protocol functions for communicating with the device in the storage area network. The predefined protocol functions include a common transport (CT) protocol function and the extended link service (ELS) protocol function. (p. 2, l. 29 - p. 3, l. 2).

As recited in independent claim 1, a storage area network (SAN) management and configuration method via enabling in-band communications comprising the steps of:

utilizing a SAN management application (102, FIGS. 1, 2. p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 16-30) for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system (120, FIGS. 1 and 2), and communicates with a host bus adapter (HBA) device driver (110, FIGS. 1 and 2), and (102, FIGS. 1, and 2; p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l.

16-30)

providing a pass through (112, 114, FIGS. 1, 2, and 3) in said HBA device driver (110, FIGS. 1 and 2) for passing communications to a designated device in the storage area network from said SAN management application including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information; and providing said pass through includes providing at least a transport pass through (112, FIGS. 1, 2, and 3, p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 16-30) and an extended link service (ELS) pass through(114, FIGS. 1, 2. p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 16-30); each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to said designated device in the storage area network. (p. 2, l. 13-28, p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 5-30).

Set forth in dependent claims 2 and 3, the step of utilizing said SAN management application (102, FIGS. 1, 2. p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 16-30) for communicating with a HBA device driver is further defined to include providing a management application agent (108, FIGS. 1 and 2) coupled between said SAN management application and said HBA device driver (110, FIGS. 1 and 2); and to include utilizing said management application agent 108 for providing predefined, fibre channel protocol functions for communicating with said device in the storage area network 120. (p. 3, l. 19-30, p. 4, l. 1-35, p. 5, l. 31 – p. 6, l. 14).

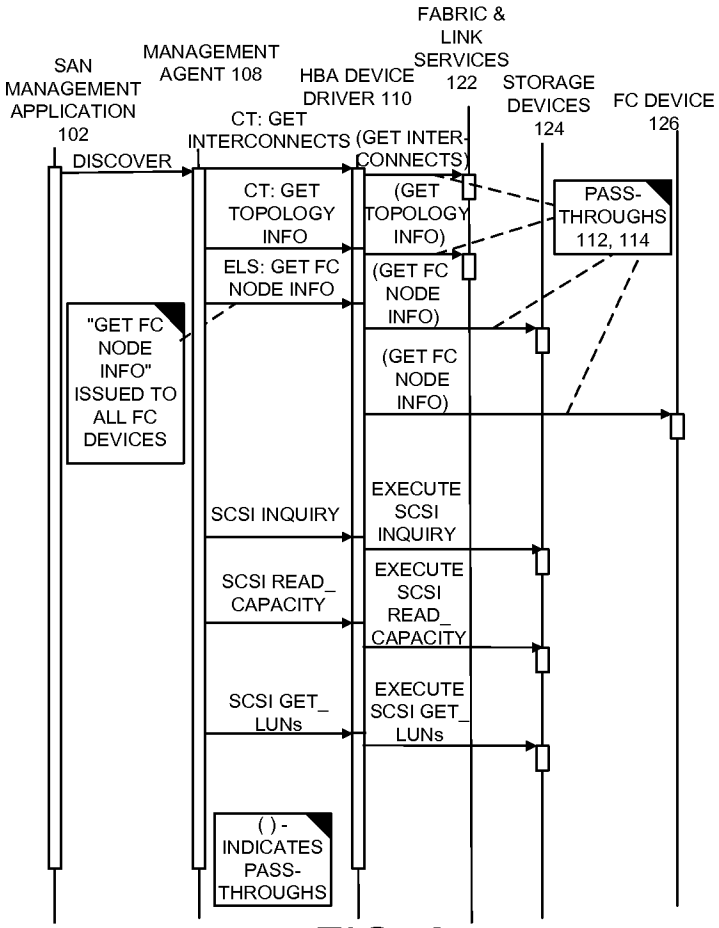


FIG. 2

As recited in independent claim 11, a storage area network (SAN) management and configuration apparatus via enabling in-band communications comprising:

a storage area network (SAN) management application (102, FIGS. 1, and 2. p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 16-30) for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system (120, FIGS. 1 and 2),;

said SAN-connected host system including a management application agent (108, FIGS. 1, 2, and 3; p. 3, l. 19-30, p. 4, l. 1-35, p. 5, l. 1-5 and 18-22) for

communicating with a host bus adapter (HBA) device driver (110, FIGS. 1 and 2),;

said HBA device driver (110, FIGS. 1 and 2) for communicating with a designated device (126, FIGS. 1, 2 and 3) in the storage area network; said HBA device driver (110, FIGS. 1 and 2) including at least one pass through service (112, 114, FIGS. 1, 2, and 3) for passing a plurality of commands to said designated device in the storage area network; said commands including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information;

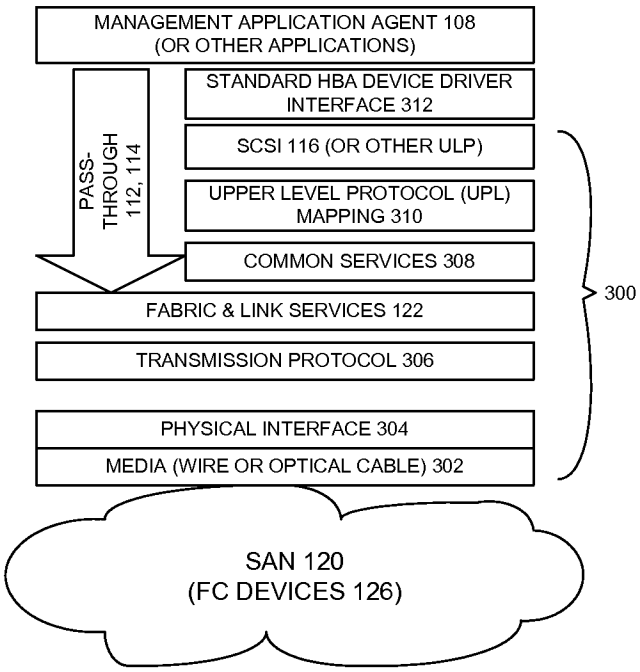
said at least one pass through including a transport pass through (112, FIGS. 1, 2, and 3, p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 16-30) and an extended link service (ELS) pass through(114, FIGS. 1, 2. p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 16-30); each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network. (p. 2, l. 13-28, p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 5-30).

In the present invention, SAN management application 102 prepares a variety of commands at different levels of fibre channel specification, for example, CT and ELS commands. The SAN connected host system 104 communicates with the management application agents 108 which communicates with the HBA device driver 110 and HBA firmware 118, HBA hardware 119, which communicates with devices 126 in the SAN cloud 120. (p. 4, l. 21-27) SAN connected host system 104, the HBA device driver 110 and HBA firmware 118, HBA hardware 119 support the CT pass-through 112

and the ELS pass-through 114, such that a variety of commands, at different levels of the fibre channel specification, for example CT and ELS protocols, are prepared by the SAN management application agent 108, and passed via the HBA device driver 110 including the CT pass-through 112 and the ELS pass-through 114 and HBA firmware 118, HBA hardware 119 to a designated device where the commands are executed. As a result the problem of requiring micro code specific to multiple vendors is avoided. A reply can be generated on the device, and that reply returns to the SAN management program 102 via the same path of the commands. (p. 4, l. 28- p. 5, l. 4)

As set forth in dependent claim 13, the said at least one pass through service bypasses said HBA device driver interface (310, FIG. 3) and a plurality of layers (116, 310, 308, FIG. 3) of said fibre channel hierarchy. (112, 114, FIGS. 1, 2, 3; p. 6, l. 8-14). See, for example, FIG. 3 below that illustrates the storage area network (SAN) 120 with FC devices 126, a fibre channel hierarchy 300 and the management application agent 108 together with the pass-through services 112, 114.

FIG. 3



As set forth in dependent claims 8 and 9, providing said pass through (112, 114; FIGS. 1, 2, and 3, p. 3, l. 19-30, p. 4, l. 1-27, p. 5, l. 16-30) in said host bus adapter (HBA) device driver (110, FIGS. 1 and 2) for passing communications to a device in the storage area network from said SAN management application includes the step of providing said pass through for passing a plurality of commands, including passing at least one performance analysis command (claim 8) and passing at least one attribute analysis command (claim 9). (p. 4, l. 21-27, p. 5, l. 5-15).

As illustrated in FIG. 2 above, the SAN connected host system 104 including the HBA device driver 110 and HBA firmware 118, HBA hardware 119 supporting the CT pass-through 112 and the ELS pass-through 114 allow several kinds of commands to

be issued. For example, the commands include topology analysis commands, such as what is connected to what, and in what zone, and the like. The commands include performance analysis commands, such as access frame counters, data volume and the like (claim 8). The commands include attribute analysis commands (claim 9), such as disk drive number of blocks in use or free. The commands include configuration commands, such as to bring disks on or off line, swap spare disks, archive data, move disks between SAN zones, and the like. (p. 5, l. 5-15)

(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection presented for review include:

The rejection of claims 1, 4, 6, 10-14 and 15-18 under 35 USC §103(a) as being unpatentable over Gunlock et al., U.S. patent 6,952,734 in view of Berman, U.S. patent 7,012,914 and further in view of McCarty, U.S. patent 6,356,944, and further in view of publication T11/99-594v2.

The rejection of claims 2, 3, 17, and 18 stand rejected under 35 USC §103(a) as being unpatentable over Gunlock et al., U.S. patent 6,952,734, Berman, U.S. patent 7,012, McCarty, U.S. patent 6,356,944, publication T11/99-594v2 and further in view of Haren, U.S. patent 6,557,060.

(7) ARGUMENT

A. INTRODUCTION

The claims 1-4, 6, and 8-18 on appeal do not all stand or fall together. The claims may conveniently be considered based upon subject matter with each of the independent claims 1, and 11, and representative dependent claims 3, 8, 9, and 13 being separately patentable.

Applicants respectfully submit that the Examiner's rejections under 35 U.S.C. § 103(a) should be reversed because the subject matter of each of independent claims 1, and 11, and dependent claims 3, 8, 9, and 13, is patentable over all the references of record. There is no teaching or suggestion in any of the cited references, individually or taken as a whole, to make the claimed invention obvious. The rejections

of claims 1-4, 6, and 8-18 under 35 U.S.C. §103(a) are improper and should be reversed.

B. THE SCOPE AND CONTENT OF THE PRIOR ART

Gunlock et al., U.S. patent 6,952,734 discloses a method and system with a node for a storage area network that has a processor, at least one port for connection to a storage area network, and a memory system. The memory system contains machine readable instructions for managing the at least one port, including instructions for determining a status associated with the at least one port capable of holding at least failed, probationary, normal and active status. For any failed port, the instructions include instructions for detecting a repair and when repair is detected for advancing the status to active or probationary status--probationary status being set when no exchange is pending to a target node reachable only through the repaired port. For probationary ports, the instructions detect when the port operates without error for a predetermined period and advances the status from probationary to active or normal. Network exchanges are preferentially routed over an active or normal port, rather than transmitting them over probationary ports. Column 8, lines 1-48 states:

Detail of Network Topology Database Structure
Node Record Detail

A node record, such a node record 412, is shown in more detail in FIG. 6. Referring to FIGS. 6 and 4, included in the record are forward and reverse list pointers 600 for linking the record to the target node list pointers 418 and to other node records such as node record 414. There are also device-link list pointers 602 for accessing the list of device links, such as device links 420 and 422. The device-link list pointers 602 are therefore pointers through which associated device records may be located.

Each node record also has node information 604 about the corresponding node of the network, including node identity information. The node identity information includes the destination ID (D.sub.-- ID) 606 required for routing frames to the node, and node identifying information including a globally unique identifier 608 for the node

and port. This identifier is unique among all the nodes of the storage area network. The node identity information may incorporate a node name 610. The globally unique identifier 608 may comprise the node name 610 and a port name associated with the HBA port record through which the node record is reachable since the combination of port name and node name is unique in the network. The node identity information permits determination of whether nodes logging in through a port have already been seen through another port. There may also be information for use in higher levels of protocol, such as a SCSI address 612 for use with SCSI-over-Fibre-Channel protocols.

The node information also has a number of fields used to manage command queues. These include a maximum queue depth 620 for the node, a current queue depth 622, a number of pending operations 624, a timer 626, and a queue depth decrement field 628 for logging the time of the most recent queue depth reduction due to a queue depth refusal.

Device Record Detail

A device record such as device record 430 has forward and reverse pointers 700 (FIG. 7) through which it is linked to the device list pointers 436 and other device records. There are also path link list pointers 702 to any associated list of path links, and device information 703. Included in the device information 703 is device identification 704, including a device name for user access to the device. The device identification 704 may also include unique device identification, such as device serial numbers. The device information 703 also includes any logical unit number 706 needed to reference the device, device type, status 707, and other device specific information 708 of interest to the driver.

Berman, U.S. patent 7,012,914 discloses methods and apparatus for Fibre Channel interconnection between a plurality of private loop devices through a Fibre Channel private loop device interconnect system. In the preferred embodiments, the Fibre Channel private loop device interconnect system is a fabric or an intelligent bridging hub. In one aspect of this invention, a Fibre Channel private loop device is connected to two or more Arbitrated Loops containing, or adapted to contain, one or more private loop devices. Preferably, the interconnect system includes a routing filter to filter incoming Arbitrated Loop physical addresses (ALPAs) to determine which Fibre Channel frames must attempt to be routed through the fabric. Numerous topologies of interconnect systems may be achieved. In another aspect of this invention, a method is

provided for implementing a logical loop of private loop devices by segmenting the logical loop into a plurality of sets, assigning each set to a physical Arbitrated Loop and connecting the Arbitrated Loops to a Fibre Channel private loop device interconnect system. Additional methods are provided for restricting attached devices to Arbitrated Loop physical addresses within certain ranges. Additionally, methods are provided for resetting hosts, the method generally comprising the steps of detecting the addition of a storage device to a first Arbitrated Loop, and thereafter, resetting the Arbitrated Loop or loops on which a host or hosts reside on second Arbitrated Loop. Methods for operation with use of SCSI initiators generate a link service reject when no address match is found, or when an address match is found, but where no device with the destination ALPA exists on the Arbitrated Loop corresponding to the destination.

Column 11, lines 51-67 states and column 9, lines 13-20 provides the stated definitions:

1. Fabric Control Module

FIG. 14 shows the Fabric Control module (FCM) 454. The FCM configures the fabric, collects and reports network management parameters and implements the fabric defined servers such as the Simple Name Server, Directory Services, etc. The FCM configures the router 452, the port control modules 451, 474, 475 and the brouter module 455. FIG. 15 shows the Fabric Control module (FCM) in more detail. The FCM is made up of fast SRAM 482, DRAM 483, a DUART 484, flash memory 485 (nonvolatile storage), a processor 481 and a Decode/DMA Control module 487. The code for the processor is contained in the flash memory 485 and is copied to SRAM upon bootup. The interface to the brouter module 455 allows the FCM to communicate through legacy networks such as ethernet and fast ethernet, depending on the brouter module.

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"Link Services Reject" or LS_RJT is a Fibre Channel Extended Link Service Command defined in the FCPH Revision 4.3 ANSI standard that notifies the transmitter of a Link Service request that the Link Service request Sequence has been rejected.

LS_RJT frames may be transmitted for a variety of conditions which may be unique to a specific Link Service Request.

McCarty, U.S. patent 6,356,944 discloses a system with a plurality of devices

compatible with the Fiber Channel Protocol, with at least one initiator/originator and one target/responder. The initiator/originator is provided with the capability to send both data and command frames to the target/responder to increase write performance. The target/responder allocates a portion of its Responder-Exchange-Identifiers for the write use of the initiator/originator, which manages the use of these identifiers. Column 9, lines 38-61 states:

> The initiator FC devices can initiate a Link Service Command/Frame after all AL_PA assignment issues have been resolved. Link Service Frames include both "request" and "response" frames. Request frames are those Link Service Frames which require a receiving device to send back a response frame and include, among others, Login Link Service Frames (PLOGI), Logout Frames (PLOGO), Discover N_Port Service Parameters Frames (PDISC), Discover Address Frames (ADISC), Process Login Frames (PRLI), Process Logout Frames (PRLO), and Reinstate Recovery Qualifier Frames (RRQ).
>
> In a single initiator environment, the initiator device sends out Link Service Frames as needed and expects in response thereto an Acknowledgment Frame (LS_ACC) or a Reject Frame (LS_RJT). Further, the initiator device keeps track of the type of Link Service Frames that are sent out by storing the type information (hereinafter "type information element") for each Link Service Frame in a storage array called outstanding link_services_array. Typically, this outstanding link_services_array comprises a plurality of storage locations each of which corresponds to a recipient device's AL_PA. Moreover, in typical embodiments, all Link Service Frame types are stored for each recipient as they are sent out.

The publication T11/99-594v2 discloses Request Topology Information (RTIN) extended link service function allowing node specification information to be provided to in-band management software.

Haren, U.S. patent 6,557,060 discloses a host expansion bridge where data is converted from a first granularity to a second granularity different from the first granularity. The ratio "n" of the second granularity of the data to the first granularity of the data is determined as a power of 2. The least significant n bits of the beginning

alignment of the data are added to the least significant n bits of the beginning count of the data, and the carry bit of the sum is designated as "c". A logical "OR" is performed of the bits of the resulting sum to obtain a value designated as "d". A number of data units, equal to the sum of "c" and "d", is added to the data. Column 4, lines 1-28 states:

> A software stack may be provided in channel adapter 119 or 119' to access the network switching fabric 100 and information about fabric configuration, fabric topology and connection information. The operating system software (OS) of the processing system 110 may include a fabric bus driver and a fabric adapter device-specific driver utilized to establish communication with a remote fabric-attached agent (e.g., I/O controller) of another processing system connected to the network, and perform functions common to most drivers, including, for example, host-fabric adapter initialization and configuration, channel configuration, channel abstraction, resource management, fabric management service and operations, send/receive I/O transaction messages, remote direct memory access (rDMA) data transfers (e.g., read and write operations), queue management, memory registration, descriptor management, message flow control, and transient error handling and recovery. Such a software driver module may be written using high-level programming languages such as C, C++ and Visual Basic, and may be provided on a tangible medium, such as a memory device, magnetic disk (fixed, floppy, and removable), other magnetic media such as magnetic tapes; optical media such as CD-ROM disks, or via Internet download, which may be available for a network administrator to conveniently plug-in or download into an existing operating system (OS). Such a software driver module may also be bundled with the existing operating system which may be activated by a particular device driver.

C. THE REJECTION OF CLAIMS 1, 4, 6, and 8-16 AS BEING UNPATENTABLE OVER GUNLOCK ET AL., BERMAN, MCCARTY, AND PUBLICATION T11/99-594v2 SHOULD BE REVERSED

The Board should reverse the rejection of claims 1, 4, 6, and 8-16 under 35 USC §103(a) as being unpatentable Gunlock et al., Berman, McCarty, and publication T11/99-594v2.

Claim 1 is patentable

Independent claim 1 recites a storage area network (SAN) management and configuration method via enabling in-band communications comprising the steps of: utilizing a SAN management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system and communicates with a host bus adapter (HBA) device driver, and providing a pass through in said HBA device driver for passing communications to a designated device in the storage area network from said SAN management application including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information; and providing said pass through includes providing at least a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to said designated device in the storage area network.

The present invention, as recited in independent claim 1 provides a novel storage area network (SAN) management and configuration method via enabling in-band communications that solves a problem of some existing SAN arrangements. A problem exists in some known storage area network arrangements, for example, in a serial storage architecture (SSA), device driver writers and host based adapter (HBA) vendors provide a complex set of micro code calls. A management program would then interrogate the HBA, using micro code calls specific to the particular HBA vendor and model, then interpret the results in a way that is specific to that particular HBA vendor

and model. One problem with this arrangement is that an in-depth understanding is needed for every HBA model of every vendor, which in the case of Fibre Channel, is impractical. There are too many vendors and too many models to implement this approach.

The subject matter of the invention, as recited in independent claim 1, is not rendered obvious from the total teaching of the references of record.

35 U.S.C. §103 requires that the invention as claimed be considered "as a whole" when considering whether the invention would have been obvious when it was made. Graham v. John Deere, 383 U.S. 1, 148 USPQ 459, 472 (1966). It is applicants' claimed invention which must be considered as a whole pursuant to 35 U.S.C. §103, and failure to consider the claimed invention as a whole is an error of law. In order for there to be a prima facie showing of obviousness under 35 U.S.C. §103, it is necessary that the references being combined in an attempt to demonstrate prima facie obviousness must themselves suggest the proposed combination. For a combination of prior art references to render an invention obvious, "[t]here must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination." In re Oetiker, 977 F.2d 1443, 1447, 24 USPQ2D 1443, 1446 (Fed. Cir. 1992). That one must point to some reason, suggestion, or motivation to make a combination is not to say that the teaching must be explicit, but in order to render an invention obvious by the combination of prior art references, the prior art must contain some reason, suggestion, or motivation. It is impermissible to use the inventor's disclosure as a "road map" for selecting and

combining prior art disclosures. In Interconnect Planning Corp. v. Feil 774 F.2d 1132, 1143, 227 USPQ 542, 551 (Fed. Cir. 1985), the Federal Circuit noted, "The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. See MPEP §2143.

The present rejection of claims 1, 4, 6, 10-14 and 15-18 under 35 USC §103(a) as being unpatentable over Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2 fails to establish at least the first and third criteria.

With respect to the first criteria, the Examiner argues that there is some suggestion or motivation to combine the Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2 references. Applicants respectfully submit that the rejections fail to meet this first criteria.

Gunlock et al. disclose a method and system with a node for a storage area network that has a processor, at least one port for connection to a storage area network, and a memory system with a node record 412 that is different from and fails to

suggest the SAN management and configuration method via enabling in-band communications of the present invention.

Berman discloses method and apparatus for Fibre Channel interconnection between a plurality of private loop devices through a Fibre Channel private loop device interconnect system that is different from and fails to suggest the SAN management and configuration method via enabling in-band communications of the present invention.

McCarty discloses a system including a plurality of devices compatible with the Fiber Channel Protocol that is different from and fails to suggest the SAN management and configuration method via enabling in-band communications of the present invention.

The publication T11/99-594v2 discloses Request Topology Information (RTIN) extended link service function allowing node specification information to be provided to in-band management software. Haren discloses a host expansion bridge where data is converted from a first granularity to a second granularity different from the first granularity. The cited references including Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2 fail to discuss or even mention any method for SAN management and configuration via enabling in-band communications. The references have no relation to one another, other than being related to computer or network communications.

The Examiner asserts that Gunlock teaches the claimed limitations of utilizing a SAN management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system and communicates with a host bus adapter (HBA) device driver; and providing a

pass through in said HBA device driver for passing communications to a designated device in the storage area network from said SAN management application including at least one topology analysis command; and said at least one topology analysis command including a command to get interconnect information and a command to get topology information. Applicants respectfully submit that the Examiner is simply wrong in these assertions.

The Examiner refers to Col. 8, lines 1-48 of Gunlock in support of these assertions. The cited portions of Gunlock are set forth above.

Applicants respectfully submit that the total teachings of Gunlock cannot be interpreted as being equivalent to or as suggesting the above steps recited in claim 1. The path error recovery method of Gunlock does not teach or suggest utilizing a SAN management application for managing and configuring the storage area network or that communicates with a host bus adapter (HBA) device driver as taught and claimed by Applicants. Applicants respectfully submit that Gunlock does not teach or suggest providing a pass through in said HBA as taught and claimed by Applicants. Applicants respectfully submit that the node record and device record of Gunlock is not equivalent to and fails to suggest the pass through in said HBA as taught and claimed by Applicants.

Only Applicants teach the above steps recited in claim 1. The above limitations of independent claim 1 are not shown nor suggested in total combination of teachings of including Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2. Thus, independent claim 1 is patentable.

The prior art of record, including Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2, provides no teaching, suggestion or inference in the prior art as a whole or knowledge generally available to one having ordinary skill in the art to achieve the claimed invention. 35 U.S.C. § 103 requires that the invention as claimed be considered "as a whole" when considering whether the invention would have been obvious when it was made. Graham v. John Deere, 383 U.S. 1, 148 USPQ 459, 472 (1966). It is applicant's claimed invention which must be considered as a whole pursuant to 35 U.S.C. § 103, and failure to consider the claimed invention as a whole is an error of law.

In the words of the Court of Appeals for the Federal Circuit, "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re John R. Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780 (Fed. Cir. 1992). See In re Gordon and Sutherland, 733 F.2d 900, 221 USPQ 1125, 1127 (Fed. Cir. 1984), Carl Schenck, A.G. v. Nortron Corp., 713 F.2d 782, 787, 218 USPQ 698, 702 (Fed. Cir. 1983), and In re Sernaker, 702 F.2d 989, 995-96, 217 USPQ 1, 6-7 (Fed. Cir. 1983).

Applicant respectfully submits that the prior art description of including Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2 falls short of applicant's invention, and the subject matter of the claimed invention as recited in claim 1 would not have been obvious to one of ordinary skill in the art in view of the references of record. Further in the cited references, there is no hint of providing any

pass through, as taught and claimed by Applicants. A combination of all the teachings of the references of record would not achieve the claimed invention as recited by claim 1.

Thus, independent claim 1 is patentable.

Claim 11 is patentable

Independent claim 11 is submitted to be patentable for the same reasons set forth above in connection with claim 1. Independent claim 11 recites a storage area network (SAN) management and configuration apparatus via enabling in-band communications comprising: a storage area network (SAN) management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system; said SAN-connected host system including a management application agent for communicating with a host bus adapter (HBA) device driver; said HBA device driver for communicating with a designated device in the storage area network; said HBA device driver including at least one pass through service for passing a plurality of commands to said designated device in the storage area network; said commands including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information; said at least one pass through including a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing

said commands to the designated device in the storage area network. The recited storage area network (SAN) management and configuration apparatus via enabling in-band communications of independent claim 11 is not shown, nor suggested, by the Gunlock et al., Berman, McCarty, and publication T11/99-594v2 references relied upon by the Examiner. A combination of all the teachings of the references of record would not achieve the claimed invention as recited by claim 11.

The references of record do not suggest the HBA device driver for communicating with a designated device in the storage area network and including at least one pass through service for passing a plurality of commands to said designated device in the storage area network; said commands including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information, as taught and recited inc claim 11.

Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2 fail to provide any suggestion of the HBA device driver, and further fail to provide any suggestion of the at least one pass through including a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network, as taught and recited inc claim 11.

Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2 fail to suggest that each of said transport pass through and said extended link service (ELS)

pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network, as taught and recited inc claim 11. The Examiner states, "Claims 11-14, 16 and 17 are rejected for similar reasons as stated above including claims 1, 6 and 10." The Examiner fails to cite any teaching or motivation in the prior art to provide the claimed limitations "each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network," as taught and recited inc claim 11. Gunlock fails to teach or suggest any pass through in a HBA driver device, as taught and claimed by applicants. Berman fails to teach or suggest any pass through in a HBA driver device. Haren fails to teach or suggest any pass through in a HBA driver device. McCarty at column 9, lines 38-61 describes initiator devices and fails to teach or suggest any pass through in a HBA driver device.

The references of record do not suggest the HBA device driver as recited by claim 11, and do not suggest the at least one pass through including a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network, as taught and recited inc claim 11. In Re Fritch 972 F.2d at 1266, 23 USPQ2d at 1780 (Fed. Cir. 1992), states: "[I]t is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious. ... This court has

previously stated that '[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." Applicants respectfully submit that the total teaching of the Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2 would not achieve the claimed invention as recited by claims 11.

Thus, independent claim 11 is patentable.

Claim 8 is patentable

Claim 8 is submitted to be patentable for the same reasons set forth above in connection with claim 1. Further representative claim 8 is separately patentable further defining the invention of claim 1 reciting that the step of providing said pass through in said host bus adapter (HBA) device driver includes providing said pass through for passing at least one performance analysis command. Only applicants teach providing said pass through in a HBA device driver. The claimed pass through for passing at least one performance analysis command of claim 8 is not shown nor suggested in total combination of teachings of the references of record. This feature is neither disclosed nor suggested by the references of record.

Applicants respectfully submit that there is no teaching or suggestion for providing a pass through in said HBA, nor that the pass through for passing at least one performance analysis command as taught and claimed by Applicants. Thus, claim 8 is further patentable over the references of record.

Claim 9 is patentable

Claim 9 is submitted to be patentable for the same reasons set forth above in connection with claims 1 and 8. Further representative claim 9 is separately patentable further defining the invention of claim 1 reciting that the step of providing said pass through in said host bus adapter (HBA) device driver includes providing said pass through for passing at least one attribute analysis command. Only applicants teach providing said pass through in a HBA device driver. The claimed pass through for passing at least one attribute analysis command of claim 9 is not shown nor suggested in total combination of teachings of all the references of record. This feature is neither disclosed nor suggested by the references of record. Thus, claim 9 is further patentable over the references of record.

Claim 13 is patentable

Claim 13 is submitted to be patentable for the same reasons set forth above in connection with claim 11. Representative claim 13 is separately patentable further defining the invention of claim 11, reciting that the SAN-connected host system includes a fibre channel hierarchy and a HBA device driver interface and that the at least one pass through service bypasses said HBA device driver interface and a plurality of layers of said fibre channel hierarchy. This pass through service that bypasses said HBA device driver interface and a plurality of layers of said fibre channel hierarchy is neither disclosed nor suggested by any of the references of record, including Gunlock et al., Berman, McCarty, Haren, and publication T11/99-594v2

Thus, claim 13 is separately patentable over the references of record.

D. THE REJECTION OF CLAIMS 2, 3, 17, AND 18 AS BEING UNPATENTABLE OVER GUNLOCK ET AL., BERMAN, MCCARTY, PUBLICATION T11/99-594v2 AND HAREN SHOULD BE REVERSED

Claim 3 is patentable

Claim 3 is submitted to be patentable for the same reasons set forth above in connection with claim 1. Further representative claim 3 is separately patentable further defining the invention of claim 1 reciting that the step of utilizing said SAN management application for communicating with a HBA device driver includes the step of providing a management application agent coupled between said SAN management application and said HBA device driver, and includes the step of utilizing said management application agent for providing predefined, fibre channel protocol functions for communicating with said device in the storage area network.. Only applicants teach providing said pass through in a HBA device driver. The Examiner cites definition of "Link Services Reject" and LS_RJT frames at column 9, lines 13-20 of Berman. Applicants respectfully submit that the references of record including Berman provide no suggestion nor motivation for providing a pass through including the transport pass through and the extended link service (ELS) pass through in said HBA device driver that are binary pass throughs, each taking applied commands and passing said commands to said designated device in the storage area network, as taught by Applicants and recited in independent claim 1. Berman provides no suggestion nor motivation for any pass throughs taking applied commands and passing said commands to said

designated device in the storage area network, as taught by Applicants and recited in independent claim 1.

The claimed management application agent and utilizing said management application agent for providing predefined, fibre channel protocol functions for communicating with said device in the storage area network of claim 3 is not shown nor suggested in total combination of teachings of the references of record. This feature is neither disclosed nor suggested by the references of record, including Gunlock et al., Berman, McCarty, publication T11/99-594v2, and Haren

Thus, claim 3 is separately patentable over the references of record.

E. CONCLUSION

Claims 1-4, 6, 10-14 and 15-18 are patentable over all the references of record and are not rendered obvious by the Gunlock et al., Berman, McCarty, and publication T11/99-594v2, and Haren. Each of the claims 1-4, 6, 10-14 and 15-18 is patentable and the Examiner's rejections should be reversed.

It is respectfully requested that the final rejection be reversed.

Respectfully submitted,

S-signature by

___/Joan Pennington/_____
By: Joan Pennington
Reg. No. 30,885
Telephone: (312) 670-0736

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(8) CLAIMS APPENDIX

CLAIMS ON APPEAL

1. A storage area network (SAN) management and configuration method via enabling in-band communications comprising the steps of:

utilizing a SAN management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system and communicates with a host bus adapter (HBA) device driver, and

providing a pass through in said HBA device driver for passing communications to a designated device in the storage area network from said SAN management application including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information; and providing said pass through includes providing at least a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to said designated device in the storage area network.

2. A storage area network (SAN) management and configuration method as recited in claim 1 wherein the step of utilizing said SAN management application for communicating with a HBA device driver includes the step of providing a management application agent coupled between said SAN management application and said HBA device driver.

3. A storage area network (SAN) management and configuration method as recited in claim 2 includes the step of utilizing said management application agent for providing predefined, fibre channel protocol functions for communicating with said device in the storage area network.

4. A storage area network (SAN) management and configuration method as recited in claim 3 wherein the step of providing predefined protocol functions for communicating with said device in the storage area network include the step of providing a transport protocol function and an extended link service (ELS) protocol function.

5. (canceled)

6. A storage area network (SAN) management and configuration method as recited in claim 1 wherein the step of providing said pass through in said host bus adapter (HBA) device driver for passing communications to a device in the storage area network from said SAN management application includes the step of providing said pass through for passing a plurality of commands.

7. (canceled)

8. A storage area network (SAN) management and configuration method as recited in claim 6 includes the step of providing said pass through for passing at least one performance analysis command.

9. A storage area network (SAN) management and configuration method as recited in claim 6 includes the step of providing said pass through for passing at least one attribute analysis command.

10. A storage area network (SAN) management and configuration method as recited in claim 6 includes the step of providing said pass through for passing at least one configuration command.

11. A storage area network (SAN) management and configuration apparatus via enabling in-band communications comprising:

a storage area network (SAN) management application for managing and configuring the storage area network; said SAN management application communicates with at least one SAN-connected host system;

said SAN-connected host system including a management application agent for communicating with a host bus adapter (HBA) device driver;

said HBA device driver for communicating with a designated device in the storage area network; said HBA device driver including at least one pass through service for passing a plurality of commands to said designated device in the storage area network; said commands including at least one topology analysis command; said at least one topology analysis command including a command to get interconnect information and a command to get topology information;

said at least one pass through including a transport pass through and an extended link service (ELS) pass through; each of said transport pass through and said extended link service (ELS) pass through being a binary pass through, each taking applied commands and passing said commands to the designated device in the storage area network.

12. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 wherein SAN-connected host system includes a fibre channel hierarchy and a HBA device driver interface.

13. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 12 wherein said at least one pass through service bypasses said HBA device driver interface and a plurality of layers of said fibre channel hierarchy.

14. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 13 wherein said plurality of layers of said fibre channel hierarchy includes a small computer system interface (SCSI) protocol driver, an upper level protocol (UPL) mapping, and a common services layer.

15. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 wherein said at least one pass through service for passing said plurality of commands to said designated device in the storage area network include at least one attribute analysis command.

16. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 further includes at least one performance analysis command and at least one configuration command.

17. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 wherein said management application agent provides predefined protocol functions for communicating with said designated device in the storage area network; said predefined protocol functions

including a transport protocol function passed to said designated device by said transport pass through.

18. A storage area network (SAN) management and configuration apparatus via enabling in-band communications as recited in claim 11 wherein said management application agent provides predefined protocol functions for communicating with said designated device in the storage area network; said predefined protocol functions including an extended link service (ELS) protocol function passed to said designated device by said extended link service (ELS) pass through.

(9) EVIDENCE APPENDIX

None.

(10) RELATED PROCEEDINGS APPENDIX

None.